

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name: Lord Kinematics

Facility Address: 124 Grant Street, Cambridge Springs, PA 16403

Facility EPA ID #: PAD 051 129 757

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

 X If yes - check here and continue with #2 below.

 If no - re-evaluate existing data, or

 if data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

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2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **“contaminated”**¹ above appropriately protective risk-based “levels” (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale / Key Contaminants</u>
Groundwater	<u>X</u>	___	___	PCE, TCE, cis-1,2 DCE, VC
Air (indoors) ²	___	<u>X</u>	___	Johnson and Ettinger Model shows no risk
Surface Soil (e.g., <2 ft)	___	<u>X</u>	___	Not reasonably suspected of contamination
Surface Water	<u>X</u>	___	___	PCE, TCE, Vinyl Chloride, cis-1,2 DCE
Sediment	___	<u>X</u>	___	Not reasonably suspected of contamination
Subsurf. Soil (e.g., >2 ft)	<u>X</u>	___	___	PCE
Air (outdoors)	___	<u>X</u>	___	Not reasonably suspected of contamination

_____ If no (for all media) - skip to #6, and enter “YE,” status code after providing or citing appropriate “levels,” and referencing sufficient supporting documentation demonstrating that these “levels” are not exceeded.

X_____ If yes (for any media) - continue after identifying key contaminants in each “contaminated” medium, citing appropriate “levels” (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

_____ If unknown (for any media) - skip to #6 and enter “IN” status code.

Rationale and Reference(s): Lord conducted an initial investigation in July and August 1997 of five SWMUs and two AOCs which were identified in a “RCRA Facility Assessment/Environmental Priorities Initiative” Report generated by the EPA in 1994. This investigation determined that all soil concentrations at these SWMUs and AOCs were below the Region 3 Risk Based Concentration standards for an industrial facility except for arsenic, which was never used at the Facility and was found to be present in the soils (7.4 to 13.2 mg/kg) at levels indicative of background concentrations for the area (3.8 mg/kg; from Dragon and Chaisson (1991)).

During the August 1997 investigation, however, the presence of tetrachloroethene (PCE) and lower concentrations of its degradation products (trichloroethene (TCE), cis-1,2-dichloroethene (DCE)) were detected in groundwater beneath the northern and northwestern portions of the site. PCE use was discontinued at the Facility in 1995. This occurrence of volatile organic compounds (VOCs) and potential exposure pathways were further evaluated through investigations in 1997 and 1998 under the Pennsylvania Act 2 Program. The results of these investigations (“Site Remedial Investigation/Risk Assessment Report” by ARCADIS Geraghty and Miller for Lord Mechanical Products Division Facility dated 11/01/98) concluded that no risk to human health existed at the Facility from VOCs in surface soil, groundwater or surface water. As a result of these findings, Lord proposed quarterly groundwater monitoring at several monitoring wells for a period of one year, after which time, monitoring would be performed on a semi-annual basis at selected wells where VOCs concentrations continued to be found at levels above appropriate risk based standards. Institutional controls and a notice of contamination were also proposed to restrict future groundwater use, and to notify the proper people of the extent of contamination at the Facility. PADEP approved this proposal in a letter to Lord dated February 23, 1999. The first year of monitoring under this plan was completed in 1999. Semi-annual groundwater monitoring for VOCs will continue in 2000 and 2001.

Groundwater: Concentrations of PCE and TCE have been detected at onsite monitoring wells above their respective Maximum Contaminant Levels (MCLs), while levels of vinyl chloride and DCE were only measured at levels above MCLs at an intermittent seep along French Creek. The highest concentrations found at the Facility for each of these contaminations is listed below, along with its respective MCL. The source of the VOC contamination in the groundwater is unknown.

	Max. Concentration Detected (ug/l)	MCL (ug/l)
Terachloroethylene (PCE)	45,000	5.0
Trichloroethylene (TCE)	250	5.0
Vinyl chloride	53	2.0
1,2-Dichloroethene (total) (DCE)	271	70

Air (indoor): Lord's manufacturing building has a below-grade portion which houses its on-site wastewater treatment system that is on the northern side of the building, in proximity to the VOCs in groundwater. This area of the building is considered a confined space, subject to health and safety monitoring and the use of personnel protection equipment (PPE) prior to employee access, therefore, the amount of time that an employee works in this area is limited. Vapor intrusion modeling (Johnson and Ettinger model) conducted as part of the site risk assessment during Act2 Remedial Investigation (Section 5.5.3.1 in ARCADIS Geraghty & Miller 1998) indicated that the VOCs present in subsurface soil and groundwater should not adversely affect indoor air quality. Additionally, historic monitoring by Lord prior to each confined space entry has not identified unacceptable atmospheric conditions in this basement area. Therefore, indoor air is not reasonably expected to be "contaminated" above appropriately protective risk-based levels.

Surface Soil (e.g. <2 ft): As documented by the August 1997 investigations, no constituents were found at any of the identified SWMUs or AOCs above PADEP Act 2 Non-Residential, soil to groundwater MSCs, or EPA Region 3's Risk Based Concentration (RBC) standards for an industrial facility, except for arsenic, which was detected above its RBC at the former solvent overspill tanks. However, arsenic was never used at the Facility and the low concentrations detected (7.4 to 13.2 mg/kg) are within the range of background concentration for Pennsylvania (3.8 mg/kg to 31 mg/kg with a mean of 12.9), as presented in Dragun and Chaisson (1991), therefore, arsenic was not retained as a contaminant of concern at the Facility.

Surface Water: Groundwater containing VOCs (PCE, TCE, cis-1,2-DCE, vinyl chloride, 1,1,1-trichloroethane, methylene chloride) is discharging to French Creek as a diffuse plume and in the form of intermittent seeps. Using groundwater modeling and dilution calculations in French Creek, Lord has predicted surface water concentrations for each of the contaminants of interest as follows:

Predicted Surface Water Concentrations (mg/l)	
1,2-Dichloroethene (total)	0.0000053
Tetrachloroethene	0.0006129
1,1,1-Trichloroethane	0.00000057
Trichloroethene	0.0000051
Vinyl Chloride	0.00000056

Sediment: Sediments are not believed to be contaminated with VOCs above an appropriate risk-based level due to their chemical properties, including volatility, low adsorptive capacity and low propensity to bio-accumulative. Additionally, a variety of studies have shown that sediment toxicity is better predicted

based on dissolved chemical concentrations in sediment pore water than on whole sediment concentrations (i.e., chemicals are more bio-available when dissolved in pore water than when adsorbed to sediment particles). Thus, Lord evaluated potential chemical concentrations in sediment based on comparisons of surface water benchmarks with measured or predicted concentrations in pore water (Ankley et al., 1996; Ditorro et al., 1991). The VOCs in sediment pore water adjacent to contaminated discharges are expected to be similar to or lower than the concentrations measured in groundwater. A comparison of VOC concentrations in groundwater and seeps at this Facility to surface water benchmarks provides a conservative means of evaluating effects on sediment-dwelling organisms within the groundwater discharge area. This site-specific evaluation predicted that VOCs in sediment pore water would not pose a risk to ecological receptors in French Creek (ARCADIS Geraghty & Miller, 1999, 2000).

Subsurface soil (e.g. >2 ft): Analytical data from the investigation north of the manufacturing building detected only one sample of PCE (600 ppb) above RBC standard in the subsurface soil, however this sample was taken at a depth through which the water table fluctuates (10 feet bgs).

Air (outdoor): based on ambient air monitoring (PID readings of zero), and the fact that VOCs are present at elevated concentrations in shallow soil and the depth to groundwater is greater than 8 feet below land surface, outdoor air is not reasonably expected to be contaminated above appropriate risk levels.

References:

Ankley, G.T., D.M. DiToro, D.J. Hansen, W.J. Berry. 1996. Technical basis and proposal for deriving sediment quality criteria for metals. *Environ. Toxicol. Chem* 15:2056 -2066

ARCADIS Geraghty & Miller. 1998. "Site Remedial Investigation/Risk Assessment Report, Lord Mechanical Products Division Facility, Cambridge Springs, Pennsylvania. ARCADIS Geraghty, November 10, 1998.

Di Toro, D.M., C.S. Zarba, D.J. Hansen, W.J. Berry, R.C. Swartz, C.E. Cowan, S.P. Pavlou, H.E. Allen, N.A. Thomas, and P.A. Paquin. 1991. Technical basis for establishing sediment quality criteria for nonionic organic chemicals using equilibrium partitioning. *Environ. Toxicol. Chem.* 10:1541 - 1583.

U.S. EPA. 1994. RCRA Facility Assessment/Environmental Priorities Initiative report. Lord Kinematics Facility. CDM federal Programs Corporation. April 1994.

Footnotes:

¹ "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL, and/or dissolved vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

² Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is rapidly developing field and reviewers are encouraged to look to the latest guidance for appropriate methods and scale of demonstration necessary to be reasonably certain that indoor

air (in structures located above (and adjacent to) groundwater with volatile contaminations) does not present unacceptable risks.

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3. Are there **complete pathways** between “contamination” and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Potential **Human Receptors** (Under Current Conditions)

“Contaminated” Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food ³
Groundwater	N	N	N	Y	N	N	N
Surface Water	N	N	N	N	N Y	N	
Soil (subsurface e.g., .2ft)	N	N	N	N	N	N	N

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors’ spaces for Media which are not “contaminated”) as identified in #2 above. (**Indoor/Outdoor Air, Sediment/Surface Water and Surface/Subsurface Soil were struck**)
2. enter “yes” or “no” for potential “completeness” under each “Contaminated” Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential “Contaminated” Media - Human Receptor combinations (Pathways) do not have check spaces (“___”). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

- _____ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter “YE” status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).
- __X__ If yes (pathways are complete for any “Contaminated” Media - Human Receptor combination) - continue after providing supporting explanation.
- _____ If unknown (for any “Contaminated” Media - Human Receptor combination) - skip to #6 and enter “IN” status code

Rationale and Reference(s):

Since the extent of contamination from the site is limited to property owned and controlled by Lord, complete exposure pathways do not exist for residents for day-care facilities.

Groundwater: The groundwater monitoring data indicates the migration of VOCs detected in groundwater at the facility is limited to a thin lense of groundwater (approximately 4 to 7 feet thick, present 8 to 10 feet below land surface (bls)) and discharges to French Creek on Lord’s property. Therefore, contact with groundwater is not a complete exposure pathway for Lord employees or area residents. While Lord has no plans for construction within the area of the Facility where VOCs are present in groundwater, future repairs on underground utilities in this area makes exposure to groundwater a potentially complete

pathway for construction workers. Another potential exposure pathway for construction workers to groundwater is future construction activities associated with Pennsylvania Department of Transportation's (PADOT's) planned Grant Street Bridge replacement project. This project is located at the northeast corner of the Lord Facility, approximately 150 feet to 200 feet from the eastern edge of the VOC plume in groundwater (defined by MW- 5 and Seep 1). This distance and the predominant groundwater flow direction at the Facility should preclude contact with VOCs in groundwater during construction on the bridge. Lord has contacted PADOT representatives to notify them of the VOC plume, and provided them with a health and safety advisory packages which identifies the potential hazards and suggests PPE use during excavations in this area. Additionally, Lord will continue to work closely with PADOT to ensure that dewatering activities, if required to support the construction, are conducted under proper safety and health controls.

Surface Water: Groundwater containing VOCs discharges to French Creek either as a diffuse subsurface plume or as intermittent seeps from an embankment on Lord's property. Therefore, a complete exposure pathway exists for persons who might be walking this section of the creek or using the surface water for recreational purposes (this scenario was defined as an adolescent trespasser scenario and evaluated in the 1998 investigation [Section 5.0 ARCADIS Geraghty & Miller 1988]). The evaluation of this exposure pathway concluded that adolescent trespassers were not expected to be risk to exposure of constituents in surface water.

Subsurface Soil (>2ft): There is no complete exposure pathway for on-site workers or construction workers due to the location and depth (8 to 10 feet bls) of the one location with subsurface soil contamination. The one location where the PCE concentration in subsurface soil exceeded the Act 2 soil to groundwater MSC and EPA Region 3's RBCs was adjacent to the parking lot, currently covered by paving or landscaping. Lord has no plans for construction in this area, and in the unlikely event that excavation to a depth of 8 to 10 feet bls is required in this area, the potential for exposure of construction workers to subsurface soil will be addressed by the safety and health procedures, such as air monitoring and the use of proper personnel protective equipment during all subsurface work at the Facility. Lord has also provided a health and safety advisory package which identifies the potential hazards and suggests PPE use during excavations in this area to underground utility organization in the area, the local municipality and PADOT (ARCADIS Geraghty & Miller 2000).

Based on this evaluation, only groundwater and surface water present a complete pathway that will be evaluated further in this EI form.

³ Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

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4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **“significant”**⁴ (i.e., potentially “unacceptable” because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable “levels” (used to identify the “contamination”); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable “levels”) could result in greater than acceptable risks)?

 X If no (exposures can not be reasonably expected to be significant (i.e., potentially “unacceptable”) for any complete exposure pathway) - skip to #6 and enter “YE” status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

 If yes (exposures could be reasonably expected to be “significant” (i.e., potentially “unacceptable”) for any complete exposure pathway) - continue after providing a description (of each potentially “unacceptable” exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

 If unknown (for any complete pathway) - skip to #6 and enter “IN” status code

Rationale and Reference(s):

Groundwater: While a complete pathway for construction worker exposure to groundwater has the potential to occur in the future, this potential exposure cannot be reasonably expected to be significant because (1) safety and health procedures such as air monitoring and the use of proper personnel protective equipment will be employed during all subsurface work at the Facility, and (2) the depth to groundwater makes it unlikely that groundwater will be encountered under most utility repair projects. This complete exposure pathway was evaluated during the risk assessment, completed as part of the Act 2 remedial investigation, and determined to be within an acceptable risk range (Hazard Index of 0.1 and Excess Lifetime Cancer Risk [ELCR] of 2×10^{-6}) (Section 5.0 ARCADIS Geraghty & Miller, 1998). Lord has provided a health and safety advisory package which identifies the potential hazards and suggests PPE use during excavation into groundwater in the area to to underground utility organizations in the area, the local municipality and PADOT.

Surface Water: The complete exposure pathway for recreational users of surface water is not reasonably expected to be significant for the following reasons. VOCs in groundwater discharging to surface water are highly volatile and would not be expected to remain in the surface water. The volume of groundwater discharging to surface water is not significant compared to the volume of water flowing in the French Creek (based on USGS harmonic mean flow data used in the evaluation per Act 2 Technical Guidance Manual). Groundwater seeps are only present during periods of low water in French Creek, which are usually associated with Summer and Fall months when growth of vegetation along the embankment limits access to recreational users. The amount of time a recreational user might stay within the limited area of French Creek affected by VOCs (plume width of less than 300 feet wide) will typically very short. Additionally, this complete exposure pathway was conservatively evaluated for an adolescent user both swimming and wading in French Creek as part of the site risk assessment completed as part of the Act 2 remedial investigation. This site risk assessment calculated a HI of 0.00001 and an ELCR of 9×10^{-9} (ARCASIS Geraghty & Miller, 1998).

⁴ If there is any question on whether the identified exposures are “significant” (i.e., potentially “unacceptable”)

consult a human health Risk Assessment specialist with appropriate education, training and experience.

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5. Can the “significant” **exposures** (identified in #4) be shown to be within **acceptable** limits?

- _____ If yes (all “significant” exposures have been shown to be within acceptable limits) - continue and enter “YE” after summarizing and referencing documentation justifying why all “significant” exposures to “contamination” are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).
- _____ If no (there are current exposures that can be reasonably expected to be “unacceptable”)- continue and enter “NO” status code after providing a description of each potentially “unacceptable” exposure.
- _____ If unknown (for any potentially “unacceptable” exposure) - continue and enter “IN” status code

Rationale and Reference(s):

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 X YE - Yes, “Current Human Exposures Under Control” has been verified. Based on a review of the information contained in this EI Determination, “Current Human Exposures” are expected to be “Under Control” at the **Lord Kinematics** facility, EPA ID # **PAD 051 129 757**, located at **124 Grant Street, Cambridge Springs PA 16403** under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

 NO - “Current Human Exposures” are NOT “Under Control.”

 IN - More information is needed to make a determination.

Supervisor (signature) /s/ Date: 9-28-00
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